



CHAPTER 5: Problem Identification

CHAPTER 5: PROBLEM IDENTIFICATION

This chapter of the Transportation Plan identifies areas of the existing transportation system that do not meet the desires of the community. The deficiencies may fall into one or more of the following categories:

- Intersection levels of service;
- Signal warrant guidelines;
- Corridor volumes, capacity and levels of service;
- Crash analysis; and
- Growth Policy issues (transportation)

Each of these areas is explored in depth in this chapter.

5.1 INTERSECTION LEVELS OF SERVICE

Urban road systems are ultimately controlled by the function of the major intersections. Intersection failure directly reduces the number of vehicles that can be accommodated during the peak hours that have the highest demand and the total daily capacity of a corridor. As a result of this strong impact on corridor function, intersection improvements can be a very cost-effective means of increasing a corridor's traffic volume capacity. In some circumstances, corridor expansion projects may be able to be delayed with correct intersection improvements. Due to the significant expense of road construction projects, a careful analysis must be made of the expected service life from intersection-only improvements. If adequate service life can't be achieved with only improvements to the intersection, then a corridor expansion may not be the most efficient solution. With that in mind, it is important to determine how well the major intersections are functioning by determining their Level of Service (LOS).

The analysis of the existing intersections were presented in **Chapter 2** of this Transportation Plan (**section 2.9**). The intersections analyzed included seven (7) signalized intersections and twenty-eight (28) un-signalized intersections. Twenty-five (25) of the intersections were counted as part of the transportation Plan effort, while the remaining ten (10) intersections had data collected as part of previous projects in the area. For those that were counted, data was collected on an average weekday between the hours of 7:00 a.m. and 9:00 a.m., and between 4:00 p.m. and 6:00 p.m. Based upon this data, the operational characteristics of each intersection were obtained. It should be recognized that some of the intersections were counted between 2:00 p.m. and 3:30 p.m., as they were adjacent to and/or impacted significantly by school discharge time periods.

Level of Service (LOS) is a qualitative measure developed by the transportation profession to quantify driver perception for such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles. It provides a scale that is intended to match the perception by motorists of the operation of the intersection. Level of Service provides a means for identifying intersections that are experiencing operational difficulties, as well as providing a scale to compare intersections with each other. The Level of Service scale represents the full range of operating conditions. The scale is based on the

ability of an intersection or street segment to accommodate the amount of traffic using it. The scale ranges from “A” which indicates little, if any, vehicle delay, to “F” which indicates significant vehicle delay and traffic congestion.

5.1.1 Signalized Intersections

For signalized intersections, recent research has determined that average stopped delay per vehicle is the best available measure of Level of Service. The following table identifies the relationship between Level of Service and average stopped delay per vehicle. The procedures used to evaluate use of signalized intersections includes gathering detailed information on geometry, lane use, signal timing, peak hour volumes, arrival types and other parameters. This information was then used to calculate delays and determine the capacity of each intersection. An intersection functions adequately if it operates at LOS C or better. **Table 5-1** defines the LOS by stopped delay for signalized intersections.

Table 5-1
Level of Service Criteria – Signalized Intersections

Level of Service	Stopped Delay per Vehicle (sec)
A	< 10
B	10 to 20
C	20 to 35
D	35 to 50
E	50 to 80
F	> 80

Using these techniques and the data collected in the spring/summer of 2007, the LOS for the signalized intersections was calculated. **Tables 5-2 & 5-3** show the AM and PM peak hour LOS for each individual leg of the intersections, as well as the intersections as a whole. The intersection LOS is shown graphically in **Figure 2-15** and **Figure 2-16** in **Chapter 2**.

Table 5-2
2007 AM Peak LOS (Signalized Intersections)

Intersection	EB	WB	NB	SB	INT
Baker Avenue & 2 nd Street	D	C	A	B	C
Central Avenue & 2 nd Street	B	C	A	A	B
Spokane Avenue & 2 nd Street	B	B	D	B	C
Spokane Avenue & 13 th Street	C	C	B	C	C
Spokane Avenue & Commerce Street	C	C	C	C	C
U.S. Hwy 93 & Montana Hwy 40	C	F	C	C	F
Wisconsin Avenue & Edgewood Place*	B	B	A	A	A

*intersection not counted by RPA

Table 5-3
2007 PM Peak LOS (Signalized Intersections)

Intersection	EB	WB	NB	SB	INT
Baker Avenue & 2 nd Street	F	D	B	B	E
Central Avenue & 2 nd Street	C	C	A	A	C
Spokane Avenue & 2 nd Street	B	B	F	C	F
Spokane Avenue & 13 th Street	C	C	B	D	C
Spokane Avenue & Commerce Street	C	C	C	C	C
U.S. Hwy 93 & Montana Hwy 40	C	F	C	E	F
Wisconsin Avenue & Edgewood Place*	B	B	A	A	A

**intersection not counted by RPA*

5.1.2 Unsignalized Intersections

Level of Service for unsignalized intersections is based on the delay experienced by each movement within the intersection, rather than on the overall stopped delay per vehicle at the intersection. This difference from the method used for signalized intersections is necessary since the operating characteristics of stop-controlled intersection are substantially different. Driver expectations and perceptions are also entirely different. For two-way stop controlled intersections the through traffic on the major (uncontrolled) street experiences no delay at the intersection. Conversely, vehicles turning left from the minor street experience more delay than other movements and at times can experience significant delay. Vehicles on the minor street which are turning right or going across the major street experience less delay than those turning left from the same approach. Due to this situation, the Level of Service assigned to a two-way stop controlled intersection is based on the average delay for vehicles on the minor street approach.

Levels of service for all-way stop controlled intersections are also based on delay experienced by the vehicles at the intersection. Since there is no major street, the highest delay could be experienced by any of the approaching streets. Therefore, the Level of Service is based on the approach with the highest delay. **Table 5-4** shows the LOS criteria for both the all-way and two-way stop controlled intersections.

Table 5-4
Level of Service Criteria –Stop Controlled Intersections

Level of Service	Delay (sec / veh)
A	< 10
B	10 to 15
C	15 to 25
D	25 to 35
E	35 to 50
F	> 50

Using the above guidelines, the data collected in the spring/summer of 2007, and calculation techniques for two-way stop controls and all-way stop controls, the LOS for the unsignalized intersection was counted. The results of these calculations are shown in **Table 5-5**. The intersection LOS is shown graphically in **Figures 2-15** and **2-16** in **Chapter 2**.

Table 5-5
2007 LOS (Stop-Controlled Intersections)

Intersection	AM	PM	Intersection	AM	PM
Ashar Avenue & 7 th Street	A	B	Pine Avenue & 7 th Street	B	B
Baker Avenue & 4 th Street	B	D	Spokane Avenue & 1 st Street	A	A
Baker Avenue & 5 th Street	B	C	Spokane Avenue & 4 th Street	C	C
Baker Avenue & 7 th Street	B	C	Spokane Avenue & 5 th Street	C	D
Baker Avenue & 10 th Street*	B	B	Wisconsin Avenue & Colorado Avenue*	B	C
Baker Avenue & 13 th Street*	B	C	Wisconsin Avenue & Denver Street*	B	C
Baker Avenue & 15 th Street*	B	B	Wisconsin Avenue & Glenwood Road*	B	B
Columbia Avenue & 7 th Street	B	B	Wisconsin Avenue & Reservoir Road*	B	C
Fir Avenue & 2 nd Street	B	B	Wisconsin Avenue & Skyles Place*	B	C
Fir Avenue & 4 th Street	B	B	Wisconsin Avenue & Woodside Lane*	C	C
Kalispell Avenue & 2 nd Street	C	C	U.S. Highway 93 & Blanchard Lake Road	B	B
Karrow Avenue & 7 th Avenue	A	A	U.S. Highway 93 & JP Road	C	C
Pine Avenue & 2 nd Street	C	C	U.S. Highway 93 & Karrow Avenue	B	D
Pine Avenue & 4 th Street	B	B	U.S. Highway 93 & State Park Road	B	C

* intersection not counted by RPA

The LOS analyses of the existing conditions in the Whitefish area reveals that some signalized and unsignalized intersections are currently functioning at LOS D or lower. These intersections are shown in **Table 5-6** and are ideal candidates for closer examination and potential intersection improvements measures.

Table 5-6
Existing Intersections Functioning at LOS D or Lower

Intersection		AM Peak Hour LOS	PM Peak Hour LOS
Baker Avenue & 2 nd Street	S	C	E
Baker Avenue & 4 th Street	U	B	D
Spokane Avenue & 2 nd Street	S	C	F
Spokane Avenue & 5 th Street	S	C	D
U.S. Hwy 93 & Karrow Avenue	U	B	D
U.S. Hwy 93 & Montana Hwy 40	S	F	F

(S)ignalized // (U)nsignalized

5.2 SIGNAL WARRANT GUIDELINES

It is the intent of this section of **Chapter 5** to offer a brief narrative concerning traffic signal control at currently unsignalized intersections with poor LOS. Before a traffic signal control can be installed at a given intersection, at least one of eight “traffic signal warrants” must be met. These warrants are as contained in the *Manual on Uniform Traffic Control Devices (Current Edition)*. The signal warrants are nationally accepted minimum standards that must be met in order for a traffic signal to be considered at an intersection. An intersection must meet at least one warrant to be eligible for signalization. The warrant descriptions from the *Manual on Uniform Traffic Control Devices* are as follows:

1. Eight-Hour Vehicular Volume -

- The Minimum Vehicular Volume is intended for application where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.
- The Interruption of Continuous Traffic is intended for application where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.
- If 80% of the Minimum Vehicular Volume and 80% of the Interruption of Continuous Traffic criteria are met, this warrant is considered to be met.

2. Four- Hour Vehicular Volume - The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

3. Peak Hour - The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of one hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

4. Pedestrian Volume - The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

5. School Crossing - The School Crossing signal warrant is intended for application where the fact that school children cross the major street is the principal reason to consider installing a traffic control signal.

6. Coordinated Signal System - Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles.

7. Crash Experience - The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.

8. **Roadway Network** - Installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network.

It is appropriate to recognize that traffic signals provide for a wide array of advantages to the overall transportation system and the various users. They also have inherent disadvantages. Listed below is a description of these advantages and disadvantages, as well as a discussion of potential alternatives to traffic control signals. This information was obtained from the *Manual on Uniform Traffic Control Devices (MUTCD)*.

5.2.1 Advantages of Traffic Control Signals

When properly used, traffic control signals are valuable devices for the control of vehicular and pedestrian traffic. They assign the right-of-way to the various traffic movements and thereby profoundly influence traffic flow. Traffic control signals that are properly designed, located, operated, and maintained may have one or more of the following advantages:

- They provide for the orderly movement of traffic;
- They increase the traffic-handling capacity of the intersection if proper physical layouts and control measures are used, and if the signal timing is reviewed and updated on a regular basis (every 2 years) to ensure that it satisfies current traffic demands;
- They reduce the frequency and severity of certain types of crashes, especially right-angle collisions;
- They are coordinated to provide for continuous or nearly continuous movement of traffic at a definite speed along a given route under favorable conditions; and
- They are used to interrupt heavy traffic at intervals to permit other traffic, vehicular or pedestrian, to cross.

5.2.2 Disadvantages of Traffic Control Signals

Traffic control signals are often considered a panacea for all traffic problems at intersections. This belief has led to traffic control signals being installed at many locations where they are not needed, adversely affecting the safety and efficiency of vehicular, bicycle, and pedestrian traffic. Traffic control signals, even when justified by traffic and roadway conditions, can be ill-designed, ineffectively placed, improperly operated, or poorly maintained. Improper or unjustified traffic control signals can result in one or more of the following disadvantages:

- Excessive delay;
- Excessive disobedience of the signal indications;
- Increased use of less adequate routes as road users attempt to avoid the traffic control signals;

- Significant increases in the frequency of collision (especially rear-end collisions); and
- Engineering studies of operating traffic control signals should be made to determine whether this type of installation and the timing program meet the current requirements of traffic.

5.2.3 Alternatives to Traffic Control Signals

Since vehicular delay and the frequency of some types of crashes are sometimes greater under traffic signal control than under STOP sign control, consideration should be given to providing alternatives to traffic control signals, even if one or more of the signal warrants has been satisfied. Some of the available alternatives may include, but are not limited to, the following:

- Installing signs along the major street to warn road users approaching the intersection;
- Relocating the stop line(s) and making other changes to improve the sight distance at the intersection;
- Installing measures designed to reduce speeds on the approaches;
- Installing a flashing beacon at the intersection to supplement STOP sign control;
- Installing flashing beacons on warning signs in advance of a STOP sign controlled intersection on major- and/or minor-street approaches;
- Adding one or more lanes on a minor-street approach to reduce the number of vehicles per lane on the approach;
- Revising the geometrics at the intersection to channelize vehicular movements and reduce the time required for a vehicle to complete a movement, which could also assist pedestrians;
- Installing roadway lighting if a disproportionate number of crashes occur at night;
- Restricting one or more turning movements, perhaps on a time-of-day basis, if alternate routes are available;
- If the warrant is satisfied, installing multi-way STOP sign control;
- Installing a roundabout; and
- Employing other alternatives, depending on conditions at the intersection.

5.2.4 Possible Traffic Signalization Control in Whitefish

Through the review of existing and expected traffic conditions for the Whitefish area, the following three (3) intersections were identified for further review of potential traffic signal warrants and subsequent traffic signal control:

- JP Road and US Highway 93;
- Baker Avenue and 13th Street; and
- Pine Avenue and 7th Street.

In reviewing the traffic signal warrants for the above three intersections, it was concluded that none of the intersections meet any traffic signal warrants under present day, existing traffic conditions. It was concluded, however, that two of the intersections will likely meet at least one of the eight traffic signal control warrants under future conditions. These two intersections are the intersections of JP Road / US Highway 93 and the intersection of Baker Avenue / 13th Street. Because of this, two projects are recommended in **chapter 8** (projects **TSM-5** and **TSM-6**, respectively).

Although some discussion was heard from the general public on provision of a traffic signal at the intersection of Pine Avenue and 7th Street, it does not appear that a traffic signal control warrant is met, or will be met under future conditions.

5.3 CORRIDOR VOLUMES, CAPACITY, AND LEVELS OF SERVICE

The corridors shown on **Figure 2-1** and **Figure 2-2** were evaluated for volume to capacity (v/c) ratios and levels of service. The number of lanes on each segment of road is shown on **Figure 2-5** and **Figure 2-6**. The volumes are shown on **Figure 2-3** and **Figure 2-4**. The resultant existing v/c ratios are shown on **Figure 3-19** and **Figure 3-20** for existing conditions. The preparation and analysis of these figures assisted in determining potential capacity deficiencies under the existing traffic conditions. Roadway capacity is of critical importance when looking at the growth of a community. As traffic volume increases, the vehicle flow deteriorates. When traffic volumes approach and exceed the available capacity, the road begins to “fail”. For this reason it is important to look at the size and configuration of the current roadways and determine if these roads need to be expanded to accommodate the existing or future traffic needs. The capacity of a road is a function of a number of factors including intersection function, land use adjacent to the road, access and intersection spacing, road alignment and grade, speed, turning movements, vehicle fleet mix, adequate road design, land use controls, street network management, and good planning and maintenance. Proper use of all of these tools will increase the number of vehicles that a specific lane segment may carry. However, the number of lanes is the primary factor in evaluating road capacity since any lane configuration has an upper volume limit regardless of how carefully it has been designed. The function of intersections, as discussed in **Section 5.1**, is a very critical element and can artificially limit lane capacity.

The size of a roadway is based upon the anticipated traffic demand. It is desirable to size the arterial network to comfortably accommodate the traffic demand that is anticipated to occur 20 years from the time it is constructed. The selection of a 20-year design period represents a desire to receive the most benefit from an individual construction project's service life within reasonable planning limits. The design, bidding, mobilization, and repair to affected adjacent properties can consume a significant portion of an individual project's budget. Frequent projects to make minor adjustments to a roadway can therefore be prohibitively expensive. As roadway capacity generally is provided in large increments, a long term horizon is necessary. The collector and local street network are often sized to meet the local needs of the adjacent properties.

There are two measurements of a street's capacity, Annual Average Daily Traffic (AADT) and Peak Hour. AADT measures the average number of vehicles a given street carries over a 24-hour period. Since traffic does not usually flow continuously at the maximum rate, AADT is not a statement of maximum capacity. Peak Hour measures the number of vehicles that a street can physically accommodate during the busiest hour of the day. It is therefore more of a maximum traffic flow rate measurement than AADT. When the Peak Hour is exceeded, the traveling public will often perceive the street as "broken" even though the street's AADT is within the expected volume. Therefore, it is important to consider both elements during design of corridors and intersections.

Street size of the roadway and the required right-of-way is a function of the land use that will occur along the street corridor. These uses will dictate the vehicular traffic characteristics, travel by pedestrians and bicyclists, and need for on-street parking. The right-of-way required should always be based upon the ultimate facility size.

The actual amount of traffic that can be handled by a roadway is dependant upon the presence of parking, number of driveways and intersections, intersection traffic control, and roadway alignment. The data presented in **Table 5-7** below indicates the approximate volumes that can be accommodated by a particular roadway. As indicated in the differences between the two tables, the actual traffic that a road can handle will vary based upon a variety of elements including: road grade; alignment; pavement condition; number of intersections and driveways; the amount of turning movements; and the vehicle fleet mix.

Roadway capacities can be increased under "ideal management conditions" (**Column 2** in **Table 5-7**) that take into account such factors as limiting direct access points to a facility, adequate roadway geometrics and improvements to sight distance. By implementing these control features, vehicles can be expected to operate under an improved Level of Service and potentially safer operating conditions. **Table 5-7** shows a range of volumes for roadways developed in the future.

Table 5-7**Approximate Volumes for Planning of Future Roadway Improvements**

Road Segment	Volumes ¹	Volumes ²
Two Lane Road	Up to 12,000 VPD	Up to 15,000 VPD*
Three Lane Road	Up to 18,000 VPD	Up to 22,500 VPD*
Four Lane Road	Up to 24,000 VPD	Up to 30,000 VPD*
Five Lane Road	Up to 35,000 VPD	Up to 43,750 VPD*

¹ Historical management conditions² Ideal management conditions

* Additional volumes may be obtained in some locations with adequate road design, access control, and other capacity enhancing methods.

Table 5-7 shows capacity levels which are appropriate for planning purposes in developing areas within the study area. In newly developing areas, there are opportunities to achieve additional lane capacity improvements. The careful, appropriate, and consistent use of the capacity guidelines listed above can provide for long-term cost savings and help maintain roads at a scale comfortable to the community.

Two important factors to consider in achieving additional capacity are peak hour demand and access control. Traffic volumes shown in **Table 5-7** are 24-hour averages; however, traffic is not smoothly distributed during the day. The major street network shows significant peaks of demand, especially the work “rush” hour. These limited times create the greatest periods of stress on the transportation system. By concentrating large volumes in a brief period of time, a road’s short-term capacity may be exceeded and a road user’s perception of congestion is strongly influenced. The use of pedestrian and bicycle programs as discussed in **Chapter 2** and TDM measures discussed in **Chapter 6** can help to smooth out the peaks and thereby extend the adequate service life of a specific road configuration. The Transportation Plan strongly recommends the pursuit of such measures as low-cost means of meeting a portion of expected transportation demand.

Each time a roadway is intersected by a driveway or another street it raises the potential for conflicts between transportation users. The resulting conflicts can substantially reduce the roadway’s ability to carry traffic if conflicts occur frequently. This basic principle is the design basis for the interstate highway system, which carefully restricts access to designated entrance and exit points. Arterial streets are intended to serve the longest trip distances in an urbanized area and the highest traffic volume corridors. Access control is therefore very important on the higher volume elements of a community’s transportation system. Collector streets, and especially local streets, do provide higher levels of immediate property access required for transportation users to enter and exit the roadway network. In order to achieve volumes in excess of that shown in **Column 2** of **Table 5-7**, access controls should be put in place by the appropriate governing body. It is strongly recommended that access control standards appropriate to each classification of street be incorporated into the subdivision and zoning regulations of the City of Whitefish and Flathead County. Follow up monitoring of the effects of access control will aid in future transportation planning efforts.

Using the traffic model developed for this project, it was possible to project the traffic volumes on all major roads within the study area. These roads were analyzed for the current year (2003) and Year 2030 conditions to determine if the roads have an adequate number of lanes for the traffic volume. **Figure 3-21** and **Figure 3-22** presented in **Chapter 3** show the projected traffic volumes for the various years within the study area. The best tool generated by the traffic model for comparing the current traffic volumes to the existing number of travel lanes on the major corridors is the volume to capacity ratio (v/c ratio). By definition, the “v/c ratio” is the result of the flow rate of a roadway lane divided by the capacity of the roadway lane. **Table 5-8** shows “v/c ratios” and their corresponding roadway corridor “Level of Service” designations.

Table 5-8
V/C Ratios & LOS Designations

V/C Ratio	Description	Corridor LOS
< 0.60	Well Under Capacity	LOS A and B
0.60 – 0.79	Under Capacity	LOS C
0.80 – 0.99	At <u>or</u> Nearing Capacity	LOS D and E
> 0.99	Over Capacity	LOS F

An examination of the “v/c ratios” computed by the traffic model, and as shown graphically on **Figure 3-23** and **Figure 3-24**, shows several roadways that are either at, nearing, or over capacity in the community during the planning year horizon (2030). **Table 4-3** in **Chapter 4** shows the roadways that are exceeding capacity now and will be exceeding capacity by the planning year (2030).

5.4 CRASH ANALYSIS

The MDT Traffic and Safety Bureau provided crash information and data for use in this Whitefish Transportation Plan. The crash information was analyzed to find high crash locations. General crash characteristics were determined along with probable roadway deficiencies and solutions. The crash information covers the three-year time period from October 1st, 2003 to September 30th, 2006. **Section 2.6** in **Chapter 2** contains detailed information concerning the crash analysis prepared for this planning project.

5.5 GROWTH POLICY ISSUES - TRANSPORTATION

It is the intent of this portion of Chapter 5 to reiterate the transportation related issues as defined in the current Growth Policy Update (2007). This particular planning project was completed on a parallel track to the Transportation Plan, and was slightly ahead of schedule in terms of public participation, goal definition, and elected official reviews. As such, the Growth Policy Update did a commendable job at capturing the flavor and issues important to the community’s citizens. For completeness, the identified issues related to “transportation” as identified in the Growth Policy Update (2007) are contained herein, along with a brief statement offering whether the issue has been or can be addressed via this Transportation Plan:

- Off-street routes called for in the Pedestrian and Bikeway Master Plan are often located along the Whitefish River, cross local streams, or traverse environmentally sensitive areas.

*This Transportation Plan supports the planned on-street and off-street non-motorized system. This information is documented in both **section 2.8 of chapter 2**, and also **section 8.5 of chapter 8**.*

- Parallel collectors along both sides of Hwy. 93 South are not yet complete. This adds to congestion on Hwy. 93 South (Spokane Avenue) during peak hours.

*This Transportation Plan supports the concept of parallel collectors to US Highway 93. Parallel collector roadways have been modeled using the travel demand model (see **chapter 3**), and projects have been recommended (**MSN-1** and **MSN-3** in **chapter 8**) to support this concept.*

- Mainly because of the Whitefish River, east-west street access is limited.

*This Transportation Plan recognizes the lack of east-west connectivity in the community. Several different crossings of the Whitefish river have been modeled using the travel demand model (see **chapter 3**), and projects have been recommended (**MSN-4** and **MSN-10** in **chapter 8**) to support this important need in the community.*

- Whitefish High School and Muldown Elementary are located within the eastside residential neighborhood. Therefore, daily traffic generated by the two schools infiltrates surrounding neighborhoods, and is a source of frequent complaints.

*This Transportation Plan recognizes the impact that school related traffic has on the surrounding neighborhoods. Issues associated with school related traffic have been identified in chapter 6 of this Transportation Plan. Specific projects have been developed to strengthen the transportation network in this area in hopes of providing choices for private automobile travel. Specific projects in the school area that will help to alleviate these complaints are projects **MSN-5**, **MSN-15**, and **TSM-2** described later in **chapter 8**.*

- Big Mountain Road provides the only general access for the Whitefish Mountain Resort as well as the many residential subdivisions on Big Mountain.

This Transportation Plan supports the conclusions portrayed in the Big Mountain Neighborhood Plan regarding primary and secondary access to the resort. Due to topography and other constraints, it is likely not feasible to develop an additional primary access serving the Big Mountain Resort. Allowances for secondary emergency access (mainly egress) is in place and should accommodate emergency situations that could potentially arise.

- The Wisconsin Avenue viaduct is the only grade-separated crossing of the BNSF rail facilities connecting downtown Whitefish to the northern neighborhoods of the city, to Iron Horse, and to Big Mountain.

*This Transportation Plan recognizes the impact that having only one grade separated crossing of the BNSF rail facilities has on overall traffic flow. Different locations for additional crossings were modeled in **chapter 3**. It is recommended in the Transportation Plan to plan for an additional crossing near the theoretical extension of Kalner Lane (Cow Creek area). This will be a feasible location in that it will only cross one rail line and will benefit both existing and the future land uses towards the southeast and northeast parts of the community (reference projects **MSN-6** and **MSN-7** in **chapter 8**).*

- Street standards should be “neighborhood sensitive” in much the same manner as land development regulations. Also, flexibility is needed in infill projects and in environmentally sensitive areas.

*This Transportation Plan recognizes this desire and agrees with the neighborhood, local context street standards presented in the Growth Policy. They are reiterated in this Transportation Plan in **chapter 9**. It must be made clear, though, that for most local streets, the local government entity (in this case the City of Whitefish) has direct control over roadway geometry and function, and can therefore dictate roadway typical section appearance. For roadways that are generally collector and above (i.e. minor arterial, principal arterial, interstate), if the facilities are on the Federally adopted “urban aid system” then the roadway geometry is dictated by Montana Department of Transportation (MDT) roadway standards. This is an important point, because the MDT does utilize “urban design standards” for the various roadway types classified as collectors and above based on dialogue and consensus with many local Montana governments dating back to the early 1990’s.*

- Residential collectors should be designed to carry traffic efficiently, but also to control vehicle speeds through residential neighborhoods.

*This Transportation Plan recognizes this concept and offers general guidance on types of traffic calming features that may be appropriate for the community to consider on various roadways. This guidance is contained in **chapter 7** of the Transportation Plan.*

- U.S. Hwy 93 runs through the middle of downtown, dividing it into a north half and south half at 2nd Street. A by-pass of some kind has long been discussed in the community, but transportation planning thus far has shown it to be infeasible.
- *The concept of a “by-pass” is not carried forward in this Transportation Plan. For a “by-pass” project to be justifiable, it must prove to be a substantial benefit under both present day and future conditions, and be weighted heavily against all impacts (i.e. environmental, financial, neighborhood sensitivity, etc.). A discussion of the effort made regarding a “by-pass” in this Transportation Plan is presented in **chapter 3**, and also summarized in **chapter 9**. The approved US Highway 93 Somers to Whitefish West Final Environmental Impact Statement (FEIS) concluded a potential “by-pass” to be unwarranted.*

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